

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions of claims in the application.

1. – 28. (Cancelled)

29. (Previously Presented) A genetic design method executable on a computer comprising:

selecting a parent profile representing an outline for design, the outline delineating a shape of a physical structure;

dividing the parent profile into segments, each of the segments having at least one dimensional characteristic;

selecting at least one segment of the divided segments;

modifying the at least one dimensional characteristic of the selected at least one segment;

and

evolving the parent profile using a genetic algorithm to produce an offspring profile, including evolving the modified at least one dimensional characteristic of the selected at least one segment, the offspring profile representing a new outline for the design, the new outline delineating a new shape of the physical structure.

30. (Previously Presented) A genetic design method as claimed in claim 29, wherein the segments of the profiles represent curves and lines of contours of externally visible components of the structure.

31. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes at least one dimensional characteristic pertaining to the overall profile.

32. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes different levels of detail.

33. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure.

34. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure, the grouping including at least one dimensional characteristic pertaining to the grouping.

35. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes at least two groupings of the segments that respectively represent at least two components of the structure, the profile including a relational parameter pertaining to a relationship between the at least two groupings.

36. (Previously Presented) A genetic design method as claimed in claim 29, wherein at least one of the profiles includes a relationship between at least two of the segments, the relationship including a radius parameter.

37. (Previously Presented) A genetic design method as claimed in claim 29, wherein the profiles are of an automobile.

38. (Previously Presented) A genetic design method as claimed in claim 29, further comprising displaying at least one of the profiles.

39. (Previously Presented) A genetic design method as claimed in claim 32, further comprising displaying at least one of the profiles at one of the different levels of detail.

40. (Previously Presented) A genetic design method as claimed in claim 33, further comprising displaying the grouping.

41. (Previously Presented) A genetic design method as claimed in claim 29, further comprising generating a family tree identifying successive generations of the parent and offspring profiles.

42. (Previously Presented) A genetic design method as claimed in claim 29, further comprising:

generating a family tree identifying successive generations of the parent and offspring profiles; and

displaying the parent profile, the offspring profile, and the family tree.

43. (Previously Presented) A genetic design method as claimed in claim 29, further comprising displaying at least one of the profiles as a three-dimensional image.

44. (Previously Presented) A genetic design method as claimed in claim 29, further comprising modifying the at least one dimensional characteristic for at least one of the segments.

45. (Previously Presented) A genetic design method as claimed in claim 31, further comprising modifying the at least one dimensional characteristic pertaining to the overall profile.

46. (Previously Presented) A genetic design method as claimed in claim 29, further comprising modifying at least one of the profiles to identify a grouping the segments that represents a component of the structure.

47. (Previously Presented) A genetic design method as claimed in claim 29, further comprising:

modifying at least one of the profiles to identify a grouping of the segments that represents a component of the structure; and

specifying at least one dimensional characteristic pertaining to the grouping.

48. (Previously Presented) A genetic design method as claimed in claim 47, further comprising modifying the dimensional characteristic pertaining to the grouping.

49. (Previously Presented) A genetic design method as claimed in claim 29, further comprising:

modifying at least one of the profiles to identify at least two groupings of the segments that respectively represent at least two components of the structure; and

specifying a relational parameter pertaining to a relationship between the at least two groupings.

50. (Previously Presented) A genetic design method as claimed in claim 49, further comprising modifying the relational parameter pertaining to the relationship between the at least two groupings.

51. (Previously Presented) A genetic design method as claimed in claim 36, further comprising modifying the relationship between the at least two segments.

52. (Previously Presented) A genetic design method as claimed in claim 29, wherein said evolving isolates at least one of the segments of the parent profile from variation.

53. (Previously Presented) A genetic design method as claimed in claim 31, wherein said evolving isolates the at least one dimensional characteristic pertaining to the overall profile from variation.

54. (Previously Presented) A genetic design method as claimed in claim 33,
wherein the grouping is part of the parent profile, and
wherein said evolving isolates the grouping from variation.

55. (Previously Presented) A genetic design method as claimed in claim 29, wherein said evolving evolves only the segments selected by a user.

56. (Previously Presented) A genetic design method as claimed in claim 29,
wherein the parent profile includes at least two groupings of the segments that
respectively represent at least two components of the structure, and
wherein said evolving evolves only the segments of the grouping selected by the user.

57. (Previously Presented) A genetic design method as claimed in claim 34,
wherein the grouping is part of the parent profile, and
wherein said evolving evolves the at least one dimensional characteristic pertaining to the
grouping.

58. (Previously Presented) A genetic design method as claimed in claim 35,
wherein the at least two groupings are part of the parent profile, and
wherein said evolving evolves the relational parameter pertaining to the relationship
between the at least two groupings.

59. (Currently Amended) A genetic design method as claimed in claim 36,
wherein the relationship between the at least two segments is part of the parent profile,
and
wherein said evolving evolves the relationship between the at least two segments. ~~Claim~~

60. (Previously Presented) A genetic design method as claimed in claim 29, wherein said evolving accounts for a user preference to keep at least one of the segments.

61. (Previously Presented) A genetic design method as claimed in claim 33, wherein said evolving accounts for a user preference to keep the grouping.

62. (Previously Presented) A computer-implemented genetic design apparatus comprising:

a first selection device for selecting a parent profile representing an outline for design, the outline delineating a shape of a physical structure;

a segmentation unit for dividing the parent profile into segments, each of the segments having at least one dimensional characteristic;

a second selection device to select at least one segment of the divided segments;

a modifying unit to modify at least one dimensional characteristic of the selected at least one segment; and

a genetic evolution unit for evolving the parent profile using a genetic algorithm to produce an offspring profile, the genetic evolution unit evolving the modified at least one dimensional characteristic of the selected at least one segment, the offspring profile representing a new outline for the design, the new outline delineating a new shape of the physical structure.

63. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein the segments of the profiles represent curves and lines of contours of externally visible components of the structure.

64. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes at least one dimensional characteristic pertaining to the overall profile.

65. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes different levels of detail.

66. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure.

67. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure, the grouping including at least one dimensional characteristic pertaining to the grouping.

68. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes at least two groupings of the segments that respectively represent at least two components of the structure, the profile including a relational parameter pertaining to a relationship between the at least two groupings.

69. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein at least one of the profiles includes a relationship between at least two of the segments, the relationship including a radius parameter.

70. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein the profiles are of an automobile.

71. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising a display to display at least one of the profiles.

72. (Previously Presented) A genetic design apparatus as claimed in claim 65, further comprising a display to display at least one of the profiles at one of the different levels of detail.

73. (Previously Presented) A genetic design apparatus as claimed in claim 66, further comprising a display to display the grouping.

74. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising a family tree generator to generate a family tree identifying successive generations of the parent and offspring profiles.

75. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising:

a family tree generator to generate a family tree identifying successive generations of the parent and offspring profiles; and

a display to display the parent profile, the offspring profile, and the family tree.

76. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising a three-dimensional display to display at least one of the profiles as a three-dimensional image.

77. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising a modification unit to modify the at least one dimensional characteristic for at least one of the segments.

78. (Previously Presented) A genetic design apparatus as claimed in claim 64, further comprising a modification unit to modify the at least one dimensional characteristic pertaining to the overall profile.

79. (Currently Amended) A genetic design apparatus as claimed in claim 62, further comprising a modification unit to modify at least one of the profiles to identify a grouping of the segments that represents a component of the structure.

80. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising:

a modification unit to modify at least one of the profiles to identify a grouping of the segments that represents a component of the structure, and to specify at least one dimensional characteristic pertaining to the grouping.

81. (Previously Presented) A genetic design apparatus as claimed in claim 80, wherein the modification unit modifies the dimensional characteristic pertaining to the grouping.

82. (Previously Presented) A genetic design apparatus as claimed in claim 62, further comprising:

a modification unit to modify at least one of the profiles to identify at least two groupings of the segments that respectively represent at least two components of the structure, and to specify a relational parameter pertaining to a relationship between the at least two groupings.

83. (Previously Presented) A genetic design apparatus as claimed in claim 82, wherein the modification unit modifies the relational parameter pertaining to the relationship between the at least two groupings.

84. (Previously Presented) A genetic design apparatus as claimed in claim 69, further comprising a modification unit to modify the relationship between the at least two segments.

85. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein said genetic evolution unit isolates at least one of the segments of the parent profile from evolving.

86. (Previously Presented) A genetic design apparatus as claimed in claim 64, wherein said genetic evolution unit isolates the at least one dimensional characteristic pertaining to the overall profile from evolving.

87. (Previously Presented) A genetic design apparatus as claimed in claim 66, wherein the grouping is part of the parent profile, and wherein said genetic evolution unit isolates the grouping from evolving.

88. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein said genetic evolution unit specifically evolves the segments selected by a user.

89. (Previously Presented) A genetic design apparatus as claimed in claim 62,
wherein the parent profile includes at least two groupings of the segments that
respectively represent at least two components of the structure, and
wherein said genetic evolution unit specifically evolves the segments of the grouping
selected by the user.

90. (Previously Presented) A genetic design apparatus as claimed in claim 67,
wherein the grouping is part of the parent profile, and
wherein said genetic evolution unit evolves the at least one dimensional characteristic
pertaining to the grouping.

91. (Previously Presented) A genetic design apparatus as claimed in claim 68,
wherein the at least two groupings are part of the parent profile, and
wherein said genetic evolution unit evolves the relational parameter pertaining to the
relationship between the at least two groupings.

92. (Previously Presented) A genetic design apparatus as claimed in claim 69,
wherein the relationship between the at least two segments is part of the parent profile,
and
wherein said genetic evolution unit evolves the relationship between the at least two
segments.

93. (Previously Presented) A genetic design apparatus as claimed in claim 62, wherein said genetic evolution unit accounts for a user preference to keep at least one of the segments unchanged during the evolving.

94. (Previously Presented) A genetic design apparatus as claimed in claim 66, wherein said genetic evolution unit accounts for a user preference to keep the grouping unchanged during the evolving.

95. (Previously Presented) A computer-implemented graphical user interface comprising:
a display displaying a parent profile representing an outline for design, the outline delineating a shape of a physical structure, the profile including segments, each of the segments having at least one dimensional characteristic; an icon for selecting at least one segment of the divided segments and modifying the at least one dimensional characteristic of the selected at least one segment; and
an icon for evolving the parent profile using a genetic algorithm to produce an offspring profile, the evolving including evolving the modified at least one dimensional characteristic of the selected at least one segment, the offspring profile representing a new outline for the design, the new outline delineating a new shape of the physical structure.

96. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the segments of the profiles represent curves and lines of contours of externally visible components of the structure.

97. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes at least one dimensional characteristic pertaining to the overall profile.

98. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes different levels of detail.

99. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure.

100. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes a grouping of the segments that represents a component of the structure, the grouping including at least one dimensional characteristic pertaining to the grouping.

101. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes at least two groupings of the segments that respectively represent at least two components of the structure, the profile including a relational parameter pertaining to a relationship between the at least two groupings.

102. (Previously Presented) A graphical user interface as claimed in claim 95, wherein at least one of the profiles includes a relationship between at least two of the segments, the relationship including a radius parameter.

103. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the profiles are of an automobile.

104. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the display displays the offspring profile.

105. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the display simultaneously displays the parent and offspring profiles.

106 (Previously Presented) A graphical user interface as claimed in claim 98, wherein the display displays at least one of the profiles at one of the different levels of detail.

107. (Previously Presented) A graphical user interface as claimed in claim 99, wherein the display displays the grouping.

108. (Previously Presented) A graphical user interface as claimed in claim 99, wherein the display includes a first window displaying at least one of the profiles and a second window displaying the grouping.

109. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the display displays a family tree identifying successive generations of the parent and offspring profiles.

110. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the display simultaneously displays the parent profile, the offspring profile, and a family tree identifying successive generations of the parent and offspring profiles.

111. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the display is a three-dimensional display displaying at least one of the profiles as a three-dimensional image.

112. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising a profile editor to specify or modify the at least one dimensional characteristic for at least one of the segments.

113. (Previously Presented) A graphical user interface as claimed in claim 97, further comprising a profile editor to specify or modify the at least one dimensional characteristic pertaining to the overall profile.

114. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising a profile editor to modify at least one of the profiles to identify a grouping of the segments that represents a component of the structure.

115. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising:

a profile editor to modify at least one of the profiles to identify a grouping of the segments that represents a component of the structure, and to specify or modify at least one dimensional characteristic pertaining to the grouping.

116. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising:

a profile editor to modify at least one of the profiles to identify at least two groupings of the segments that respectively represent at least two components of the structure, and to specify or modify a relational parameter pertaining to a relationship between the at least two groupings.

117. (Previously Presented) A graphical user interface as claimed in claim 102, further comprising a profile editor to specify or modify the relationship between the at least two segments.

118. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising a profile editor to isolate at least one of the segments of the parent profile from evolving.

119. (Previously Presented) A graphical user interface as claimed in claim 97, further comprising a profile editor to isolate the at least one dimensional characteristic pertaining to the overall profile from evolving.

120. (Previously Presented) A graphical user interface as claimed in claim 99, wherein the grouping is part of the parent profile, and further comprising a profile editor to isolate the grouping from evolving.

121. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising a profile editor to select at least one of the segments specifically for evolving.

122. (Previously Presented) A graphical user interface as claimed in claim 95, wherein the parent profile includes at least two groupings of the segments that respectively represent at least two components of the structure, and further comprising a profile editor to select one of the two groupings specifically for evolving.

123. (Previously Presented) A graphical user interface as claimed in claim 100, wherein the grouping is part of the parent profile, and wherein the genetic algorithm evolves the at least one dimensional characteristic pertaining to the grouping.

124. (Previously Presented) A graphical user interface as claimed in claim 101, wherein the at least two groupings are part of the parent profile, and wherein the genetic algorithm evolves the relational parameter pertaining to the relationship between the at least two groupings.

125. (Previously Presented) A graphical user interface as claimed in claim 102, wherein the relationship between the at least two segments is part of the parent profile, and wherein the genetic algorithm evolves the relationship between the at least two of the segments.

126. (Previously Presented) A graphical user interface as claimed in claim 95, further comprising a profile editor to specify a user preference to keep at least one of the segments unchanged during the evolving.

127. (Previously Presented) A graphical user interface as claimed in claim 99, further comprising a profile editor to specify a user preference to keep the grouping unchanged during the evolving.

128. (Previously Presented) A computer-readable medium encoded with processing instructions for executing a genetic design method, comprising:

- selecting a parent profile representing an outline for design, the outline delineating a shape of a physical structure;
- dividing the parent profile into contiguous connected segments, each of the connected segments having at least one dimensional characteristic;
- selecting at least one of the divided segments;

modifying the at least one dimensional characteristic of the selected at least one segment;
and

evolving the parent profile using a genetic algorithm to produce an offspring profile,
including evolving the modified at least one dimensional characteristic of the selected at least
one segment, the offspring profile representing a new outline for the design, the new outline
delineating a new shape of the physical structure.

129. (New) A genetic design method as claimed in claim 29, wherein the physical
structure is one of an airplane, a ship, a train and a toy.